





## 8000 Series I/O

Product Catalog

◆ NovaTech®

8000 Series I/O

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## Contents

### Family Overview

4

### Module Data Sheets

#### Analog Input Modules

- NT-8101-HI-TX 8-channel AI, 4-20mA with HART for 2- or 4-wire 8
- NT-8103-AI-TX 8-channel AI, 4-20mA for 2- or 4-wire 9
- NT-8119-VI-05 8-channel Voltage Input, 1-5Vdc 10
- NT-8132-AI-UN 8-channel isolated AI, 4-20mA with HART, Thermocouple, RTD, Voltage 11
- NT-8105-TI-TC 4-channel THC/mV input 13
- NT-8106-TI-RT 4-channel RTD input 14

#### Analog Output Modules

- NT-8102-HO-IP 8-channel AO, with HART for 4-20mA 15
- NT-8104-AO-IP 8-channel AO, 4-20mA 16

#### Digital Inputs

- NT-8109-DI-DC 8-Channel DI, 24Vdc isolated, sinking 17
- NT-8110-DI-DC 8-channel DI, 24Vdc non-isolated, module powered 18
- NT-8121-DI-DC 16-channel DI, 24Vdc non-isolated, module powered 19
- NT-8122-DI-DC 16-channel DI, 24Vdc isolated, sinking 20
- NT-8111-DI-AC 8-channel DI, 115Vac isolated, sinking 21
- NT-8112-DI-AC 8-channel DI, 115Vac non-isolated, module powered 22
- NT-8113-DI-AC 8-channel DI, 230Vac isolated, sinking 23
- NT-8114-DI-AC 8-channel DI, 230Vac non-isolated, module powered 24

#### Digital Outputs

- NT-8115-DO-DC 8-channel DO, 2-60Vdc non-isolated, module powered 25
- NT-8117-DO-DC 8-channel DO, 2-60Vdc isolated, unpowered 26
- NT-8116-DO-AC8-channel DO, 20-250Vac non-isolated, module powered 27
- NT-8118-DO-AC8-channel DO, 20-250Vac isolated, unpowered 28

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#### Overview

The NovaTech 8000 Series I/O is the newest remote I/O family native to the D/3® Process Automation System (PAS). It is the preferred I/O for new installations and it can replace the older NovaTech 16000 series I/O in existing PCM cabinets, using existing field wiring connected to new termination panels with existing connectors.

With its -40 to +70° temperature range and G3 corrosive coating, the NovaTech 8000 Series I/O is an I/O system designed for field mounting. It connects to conventional and smart field devices through multi-channel I/O modules. The modules communicate, via a fast internal bus, with redundant Ethernet Bus Interface Modules (EBIMs) which provide dual-redundant high speed Ethernet data connections to the D/3®.

Up to 64 I/O modules can be supported within a single 8000 Series node, and each module has between 4 and 16 channels. An EthernetMPC card can support up to 50 nodes. With the availability of intrinsically safe modules, 8000 Series I/O provides a solution for both general purpose and hazardous area applications - even within the same node.

Designed for use with PCM 4100 or PCM 4200 PCI-based PCMs, it requires an Ethernet Multi Protocol Controller (EthernetMPC) card and D/3® version 12.2-2 or higher.

#### Key Features

- Wide range of input and output types, in any mix
- Up to 64 I/O modules per node
- Up to 50 nodes per EthernetMPC card
- Wide operating temperature range, -40 to +70°C
- General-purpose and intrinsically-safe I/O within a single node
- Redundant Local Area Networks (LAN) and power supplies supported
- High channel density
- Zone 2 and Division 2 hazardous area mounting as standard
- I/O module hot-swapping even in Zone 2 and Division 2
- HART® pass-through supported
- Rugged construction, optimized for true field mounting
- Integrated (per-channel) fusing and loop-disconnect facility
- Bussed field power on carriers eliminates daisy-chain wiring at field terminals
- Sophisticated mechanical keying system eliminates risk to plant and personnel

8000 Series connects to both conventional (such as 4-20mA) and smart field devices. It allows the cost benefits of fieldbus to be enjoyed with existing field instruments—ideal for plant upgrades and expansions. Pass-through of HART® information between HART® instruments and the D/3® network is possible.

8000 Series nodes can be located within, and connected into, a hazardous area where there is a risk of explosion from flammable gases. The standard, general purpose system is approved for operation in a Zone 2 or Class I, Division 2 hazardous area, with field devices in a similarly classified area. I/O modules with intrinsically safe field circuits can be connected to certified devices in Zone 0 and Class I, II, III, Division 1 hazardous areas.

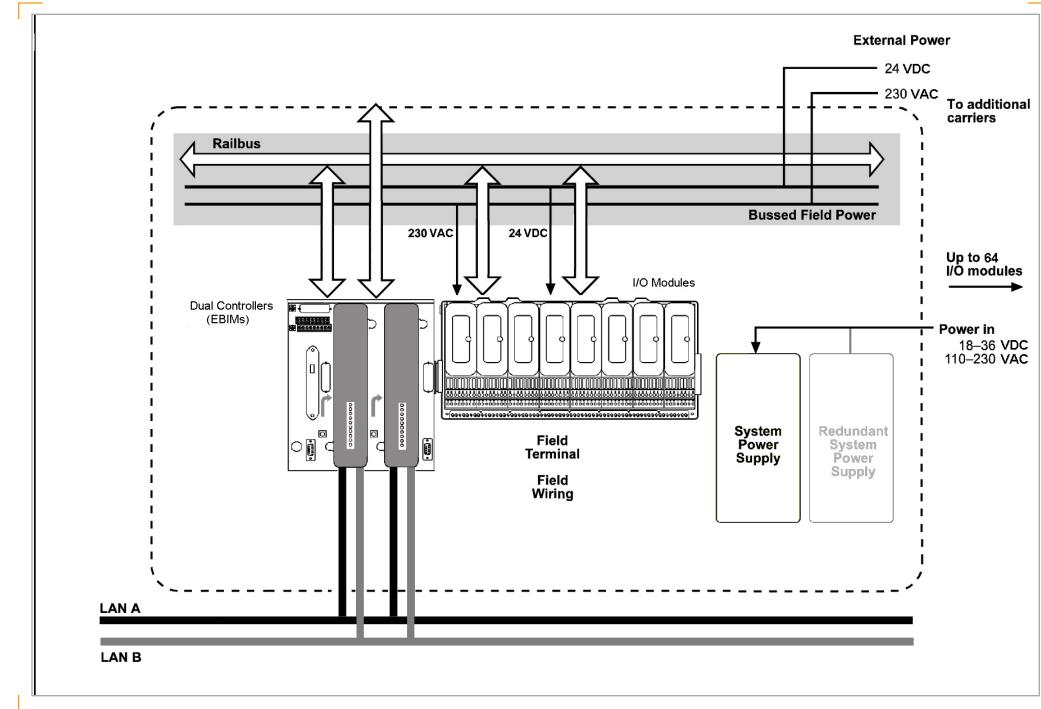
Enclosures are also available for application where the Series 8000 node must be located in a Zone 1 or Division 1 area—consult NovaTech for availability.



8000 Series I/O

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### Node Architecture

An 8000 Series node comprises single or redundant Ethernet Bus Interface Modules, up to 64 I/O modules, field terminals, and associated power supplies.

A schematic node architecture is shown below. Information from the I/O modules is transferred to and from the communication module (EBIM) via the Railbus. The Railbus is a fast, serial data bus with parallel module addressing and extends over the full length of the node. The parallel address architecture means that each I/O module position has a unique address which eliminates the need to 'train' modules during installation.

Power for the node is provided by integrated power supply modules; these convert the locally available power source into a regulated internal supply rail. This rail energizes the EBIM and all Railbus communication between the EBIM and I/O modules.

For some I/O module types—such as those with low-power and intrinsically safe field circuits—it also provides power for the field wiring. Where additional power is required for field devices (such as high current AC circuits), power can be provided by means of cabled connections from each module to external relays. This Bussed Field Power facility reduces instal-

lation time by removing the need to make daisy chain wiring connections at the field terminals of each I/O module.

### Node Operation

A typical request for data from the field might happen as follows:

The D3® PAS requires the temperature from a particular thermocouple input at a particular node and transmits a signal on the I/O LAN. There are several Series 8000 nodes on the I/O LAN, but the EBIM at the chosen node recognizes its own node address, and acknowledges the request.

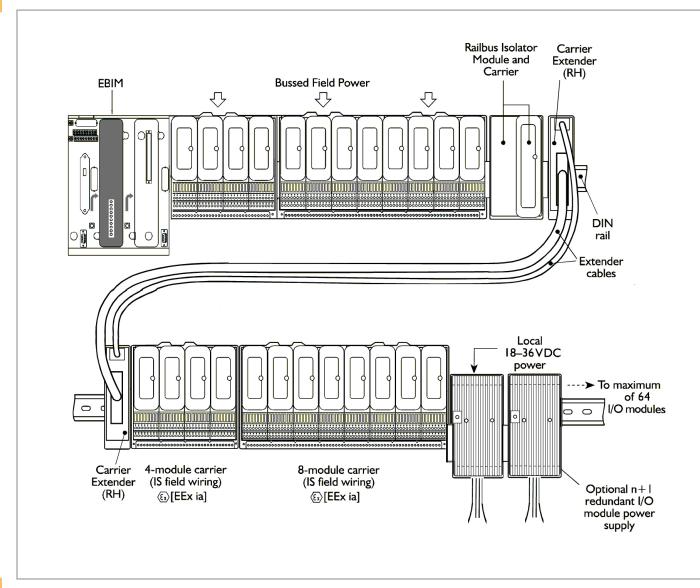
At each node, the input modules constantly monitor, linearize and digitize their respective field signals, and make them available to scanning on the node's internal bus (Railbus).

The EBIM continually scans the I/O modules via the Railbus, and builds up a map of the values of the input variables, ready for the PCM to read. These are converted into the LAN protocol and placed on the LAN by the EBIM, together with acknowledgement signals. The D3 then interprets the signal and reconstructs the temperature reading.

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### NovaTech 8000 Series I/O Components

#### Modules

I/O modules transfer signals to and from field instruments. Input modules receive signals from transmitters and sensors and convert them into a digital form for presentation to the EBIM. Output modules receive commands from the EBIM and transfer them to actuators. A wide range of modules is available, including types for low-level instrumentation, AC circuits, and intrinsically safe signals. I/O modules typically have 4, 8, or 16 field channels.

#### Carriers

Carriers allow the 8000 Series I/O to mount onto a flat panel or T- or G-section DIN rail. They support and interconnect the EBIM, power supplies, I/O modules and field terminals, and carry the address, data and power lines of the internal Railbus. They provide termination points for the LAN and field wiring cable screens and can also distribute bussed field power to the I/O modules. I/O module carriers support eight I/O modules.

#### Field Terminals

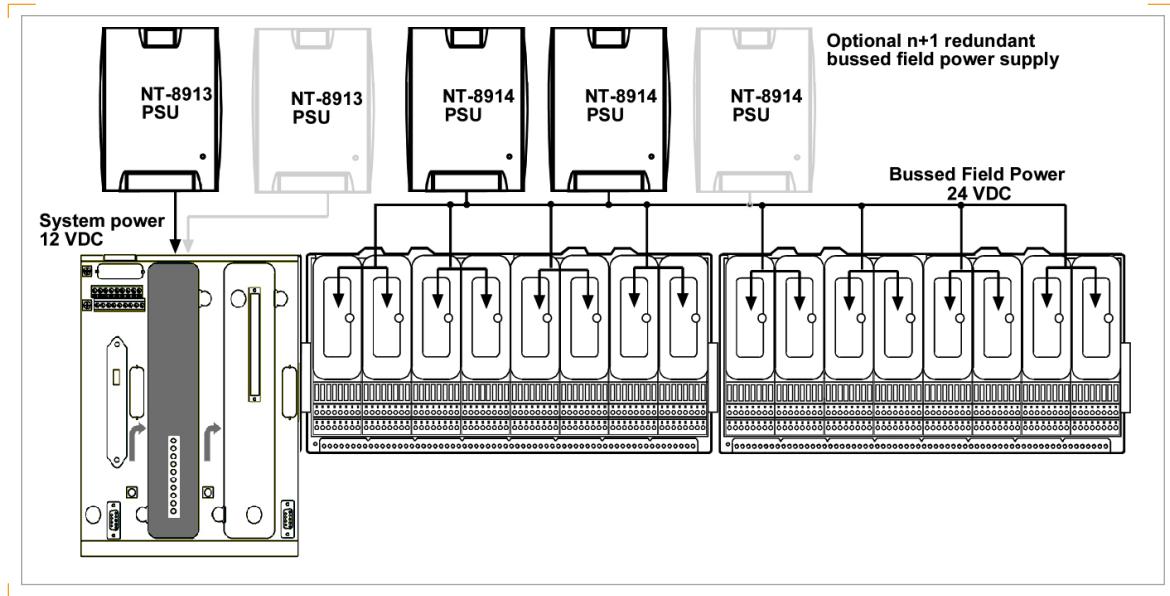
Field terminals provide the interface between the I/O modules and the field wiring. They include fusing and loop disconnect as options. A mechanical keying system prevents an I/O module from being connected to the wrong type of field terminal. Field terminals mount onto the module carrier, one to each I/O module. They are clamped firmly by the I/O module to form an electrical and mechanical assembly of high integrity. They may be replaced in service without removing carriers or disturbing the operation of other modules.

#### Power Supplies

8000 Series I/O power supplies accept locally available unregulated power and provide a regulated supply for the EBIM and I/O modules. Supply redundancy is supported. The system power supply at an 8000 Series node converts the local DC supply to power the node, and can also provide field power for I/O modules with low-level field circuits. Where heavy-current or AC mains circuits are handled by the I/O modules, the 8000 Series method for distributing field power avoids complex wiring at the field terminal and minimizes the backplane/carrier wiring.

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### Ethernet Bus Interface Module (EBIM)

NovaTech 8000 Series I/O uses the Ethernet Bus Interface Module (EBIM) to provide a high speed Ethernet data connection to the D/3®. The EBIMs communicate using a proprietary protocol over Ethernet at speeds of 10/100MB to the D/3® PCMs.

### NovaTech 8000 Series I/O Support

8000 Series I/O offers a variety of I/O boards and signal conditioning termination panels suitable for virtually every standard process sensor and actuator. Details on signal conditioning termination panels, as well as their associated I/O function boards, can be obtained in individual specification sheets. The standard D/3® configuration supports such I/O signals as:

- Analog Inputs: 4-20 mA, 10-50 mA, 0-10V (programmable ranges of 0-50mV, 0-100mV, 0-1V and 0-10V), 100 ohm platinum RTDs, thermocouples
- Analog Outputs: 4-20 mA, 10-50 mA, 0-10V
- Digital and Pulse Inputs:
  - Contact Closures +5, +12, +24 and +10 to +32 VDC
  - Contact Closures 95 to 130 VAC
  - Pulse Train Inputs up to 100 KHz @ +5, +12, +24 VDC

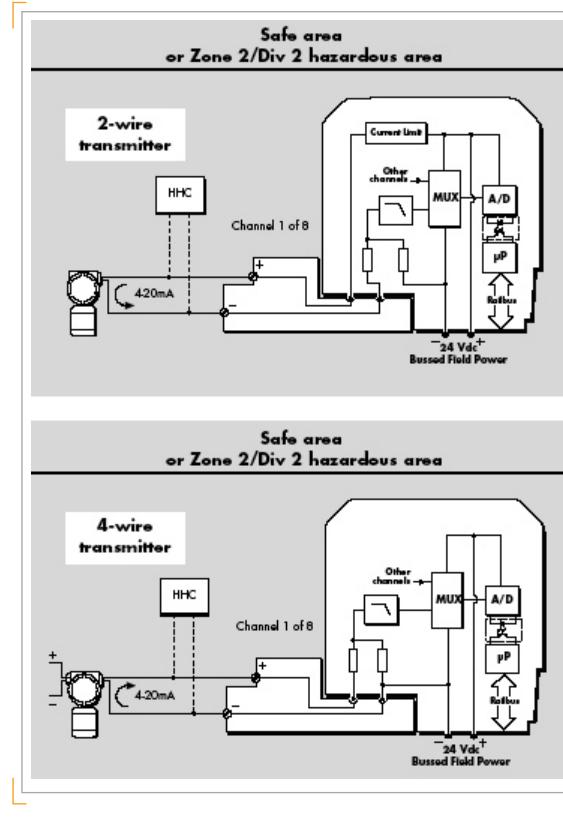
- Pulse Train Inputs up to 50 Hz @ +10 to +32 VDC and 95 to 130 VAC
- Digital and Pulse Outputs:
  - DC Output +5, +12, +24, and +5 to +60 VDC
  - AC Output 12 to 140 VAC
  - Pulse Output 2 msec. to 3.3 sec. @ +5, +12, +24, and +5 to +60 VDC
  - Pulse Output 10 msec. to 11 min. @ +5, +12, +24, and +5 to +60 VDC
  - Pulse Output 2 msec. to 3.3 sec. @ 12 to 140 VAC
  - Pulse Output 10 msec. to 11 min. @ 12 to 140 VAC

- **8 single-ended 4-20 mA input channels**
- **Non-incendive field circuits**
- **HART pass-through**
- **HART variable and status reporting**
- **2- or 4-wire transmitters**
- **open and short circuit detection**
- **24 V dc bussed field power required**

### Module Specifications

#### Inputs

|                                   |                 |
|-----------------------------------|-----------------|
| Number of channels .....          | 8, single-ended |
| Nominal signal range (span) ..... | 4 to 20 mA      |
| Full signal range.....            | 1 to 23 mA      |
| Line fault detection              |                 |
| Short circuit current .....       | > 23.5 mA       |
| Open circuit current .....        | < 0.5 mA        |
| Output voltage (@ 20mA).....      | 13.5 V (min.)   |
| Output current .....              | .32 mA (max.)   |
| Accuracy (over temp range) .....  | ± 0.1% of span  |
| Resolution .....                  | 16 bits         |
| Repeatability .....               | 0.05% of span   |
| Isolation                         |                 |
| (any channel to Railbus) .....    | 100 V ac        |
| (between channels).....           | none            |



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NovaTech 8000 Series I/O Family

#### Configurable Parameters

|  |                              |
|--|------------------------------|
| Input filter time constant .....         | user defined value           |
| Input dead zone .....                    | user defined value           |
| Drive on failsafe.....                   | disabled /upscale /downscale |
| Channel status.....                      | active /inactive             |
| HART variable and status reporting ..... | enable /disable              |

#### Response Time

|  |                    |
|--|--------------------|
| Signal change to availability on Railbus |                    |
| 4-20 mA mode .....                       | 27 ms (max.)       |
| HART mode.....                           | 0.75 s per channel |

#### Safety

FM non-incendive field wiring parameters (each channel)  
 $V_{oc} = 28.7 \text{ V}$ ;  $I_{sc} = 33 \text{ mA}$ ;  $C_a = 0.17 \mu\text{F}$ ;  $L_a = 11.0 \text{ mH}$

#### Power Supplies

|                                   |                              |
|-----------------------------------|------------------------------|
| Railbus (12V) current .....       | 100 mA (typ.), 150 mA (max.) |
| Bussed Field Power 2-wire Tx..... | 300 mA (max.)                |
| (@ 24 V dc ±10%) 4-wire Tx.....   | 60 mA (max.)                 |

#### Mechanical

|                       |       |
|-----------------------|-------|
| Module Key Code ..... | A1    |
| Module width .....    | 42 mm |
| Weight.....           | 200 g |

#### Field Terminals (2-WIRE TX)

| Field Wiring                            | Recommended Field Terminal  | Compatible Field Terminal   |
|---|-----------------------------|-----------------------------|
| General Purpose                         | NT-8602-FT-ST Standard      | NT-8604-FT-FU Fused         |
| Class 1, Div 2 or Zone 2 hazardous area | NT-8601-FT-NI Non-incendive | NT-8603-FT-FU Non-incendive |

#### Field Terminals (4-WIRE TX)

| Field Wiring                            | Recommended Field Terminal | Compatible Field Terminal |
|---|----------------------------|---------------------------|
| General Purpose                         | NT-8615-FT-4W              | -                         |
| Class 1, Div 2 or Zone 2 hazardous area | NT-8615-FT-4W              | -                         |

#### Contact:

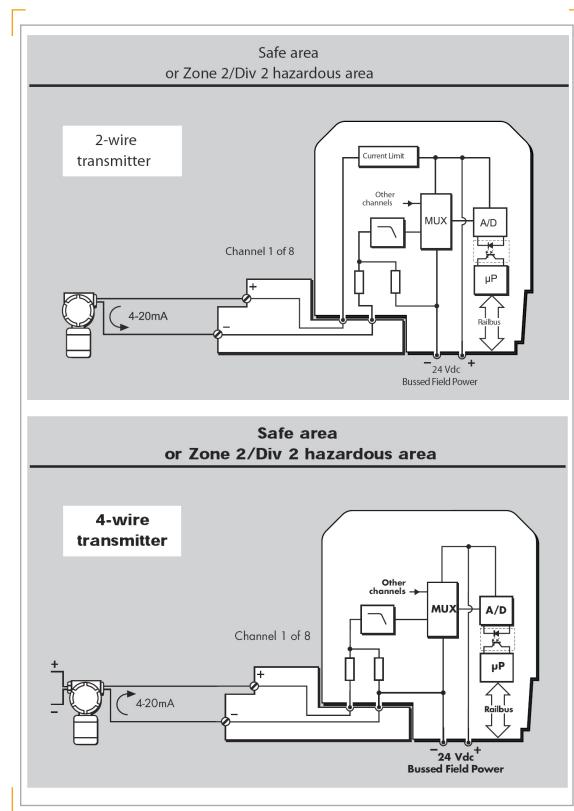
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- **8 single-ended 4-20mA input channels**
- **Non-incendive field circuits**
- **4-20mA**
- **2- or 4-wire transmitters**
- **Open and short circuit detection**
- **24Vdc bussed field power required**

### Module Specifications

#### Inputs

|                                   |                 |
|-----------------------------------|-----------------|
| Number of channels .....          | 8, single-ended |
| Nominal signal range (span) ..... | 4 to 20 mA      |
| Full signal range.....            | 1 to 23 mA      |
| Out of range alarm                |                 |
| Lower threshold.....              | > 23.5 mA       |
| Upper threshold .....             | < 0.5 mA        |
| Output voltage (@ 20 mA).....     | 13.5 V (min.)   |
| Output current .....              | 32 mA (max.)    |
| Accuracy (over temp range) .....  | ± 0.1% of span  |
| Resolution .....                  | 16 bits         |
| Repeatability .....               | 0.05% of span   |
| Isolation                         |                 |
| (any channel to Railbus) .....    | 100 V ac        |
| (between channels).....           | none            |



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### 8-channel Analog Input

4-20 mA



NovaTech 8000 Series I/O Family

#### Configurable Parameters

|                                  |                              |
|----------------------------------|------------------------------|
| Input filter time constant ..... | user defined value           |
| Input dead zone .....            | user defined value           |
| Drive on failsafe.....           | disabled /upscale /downscale |
| Channel status.....              | active /inactive             |

#### Response Time

Signal change to availability on Railbus .....27 ms (max.)

#### Safety

FM non-incendive field wiring parameters (each channel)  
 $V_{oc} = 28.7 \text{ V}$ ;  $I_{sc} = 33 \text{ mA}$ ;  $C_a = 0.17 \mu\text{F}$ ;  $L_a = 11.0 \text{ mH}$

#### Power Supplies

Railbus (12V) current .....100 mA (typ.)/150 mA (max.)  
 Bussed Field Power .....2-wire Tx 300 mA (max.)  
 (@ 24 Vdc ± 10%) 4-wire Tx 60 mA (max.)

#### Mechanical

|                       |       |
|-----------------------|-------|
| Module Key Code ..... | A1    |
| Module width .....    | 42 mm |
| Weight.....           | 200 g |

#### Field Terminals (2-wire TX)

| Field Wiring                            | Recommended Field Terminal  | Compatible Field Terminal         |
|---|-----------------------------|-----------------------------------|
| General Purpose                         | NT-8602-FT-ST Standard      | NT-8604-FT-FU Fused               |
| Class 1, Div 2 or Zone 2 hazardous area | NT-8601-FT-NI Non-incendive | NT-8603-FT-FU Non-incendive Fused |

#### Field Terminals (4-wire TX)

| Field Wiring                            | Recommended Field Terminal | Compatible Field Terminal |
|---|----------------------------|---------------------------|
| General Purpose                         | NT-8615-FT-4W              | -                         |
| Class 1, Div 2 or Zone 2 hazardous area | NT-8615-FT-4W              | -                         |

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- **8 single-ended input channels**
- **Non-incendive field circuits**
- **1-5 V inputs open circuit and short circuit detection**
- **24 V dc bussed field power required**

### Module Specifications

#### Inputs

|  |   |
|--|---|
| Number of channels .....                 | 8, single-ended                         |
| Nominal signal range (span) .....        | 1 to 5 V                                |
| Full signal range .....                  | 0.19 to 5.64 V                          |
| Input impedance.....                     | 2 MΩ                                    |
| Out of range alarm                       |   |
| Lower threshold .....                    | < 0.19 V                                |
| Upper threshold .....                    | > 5.64 V                                |
| Accuracy (over temp range) .....         | ± 0.1% of span                          |
| Resolution .....                         | 16 bits                                 |
| Repeatability .....                      | 0.05% of span                           |
| Isolation (any channel to Railbus) ..... | 100 V ac<br>(between channels).....none |

#### Configurable Parameters

|                                  |                              |
|----------------------------------|------------------------------|
| Input filter time constant ..... | user defined value           |
| Input dead zone .....            | user defined value           |
| Drive on failsafe.....           | disabled /upscale /downscale |
| Channel status.....              | active /inactive             |

#### Response Time

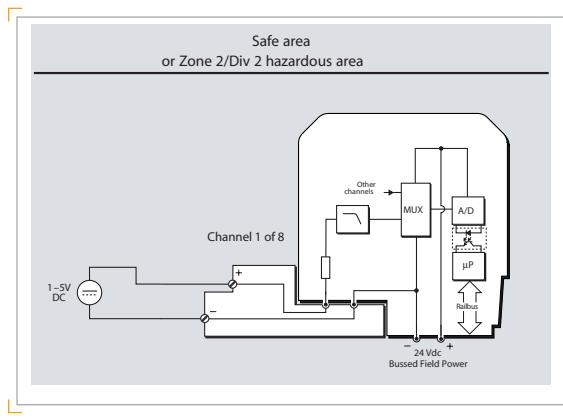
Signal change to availability on Railbus .....27 ms (max.)

#### Safety

FM non-incendive field wiring parameters (each channel)  
..... $V_{oc} = 28.7$  V;  $I_{sc} = 33$  mA;  $C_a = 0.17$   $\mu$ F;  $L_a = 11.0$  mH

#### Power Supplies

Railbus (12V) current .....100 mA (typ.)/150 mA (max.)  
Bussed Field Power ..... 60 mA (max.) at 24 Vdc  $\pm$  10%



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## 8-channel Analog Input

1-5 V



NovaTech 8000 Series I/O Family

#### Mechanical

|                       |       |
|-----------------------|-------|
| Module Key Code ..... | A1    |
| Module width .....    | 42 mm |
| Weight.....           | 200 g |

#### Field Terminals

| Field Wiring                                    | Recommended Field Terminal          | Compatible Field Terminal |
|---|-------------------------------------|---------------------------|
| General Purpose                                 | NT-8615-FT-4W<br>4-wire transmitter | -                         |
| Class 1, Div 2<br>or Zone 2 hazard-<br>ous area | NT-8615-FT-4W<br>4-wire transmitter | -                         |

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- 8 isolated, universal, input channels
- Configurable on a channel by channel basis:
  - 4-20mA, THC, RTD, resistance & voltage
  - 250V ac rms channel to channel isolation
- Thermocouple types B, E, J, K, N, R, S, T, W3, W5, Russian K, Russian L
- RTD types Pt100, jPt100, Pt200, Pt500, Ni120, Cu10
- Volt input types  $\pm 120\text{mV}$ , 0-1V, 0-5V, 1-5V, 0-10V,  $\pm 10\text{V}$
- 2 or 3-wire RTDs
- 2 or 4-wire transmitters
- Non-incendive field circuits
- 24 V dc bussed field power required

### Module Specifications

#### Inputs

Number of configurable channels ..... 8 isolated

#### 4-20mA Inputs

Nominal signal range (span) ..... 4 to 20mA  
 Full signal range (FSR) ..... 0 to 25mA  
 Output voltage (@ 20mA) ..... 13.5 V (min.)  
 Output current (linear operation) ..... 25 mA (max.)  
 Short circuit current (max.) ..... 75 mA for 100ms  
 (Output turns off after ~100ms at more than 25mA)  
 Calibration accuracy  
   10°C to 40°C .....  $\pm 0.1\%$  of FSR  
   -40°C to 70°C .....  $\pm 0.3\%$  of FSR  
 Resolution ..... 15 bits (typ.)  
 Repeatability ..... 0.05% of span

#### Thermocouple Inputs

THC Types ....B, E, J, K, N, R, S, T, W3, W5, Russian K, Russian L  
 Calibration Accuracy  
   10°C to 40°C .....  $\pm 0.1\%$  of span (typ.)  
   -40°C to 70°C .....  $\pm 0.2\%$  of span (typ.)  
 Cold junction compensation error  $\dagger < \pm 1^\circ\text{C}$  (-40°C to + 70°C)



8-channel Isolated Universal  
Analog Input

4-20mA with Thermocouple, RTD, Voltage



NovaTech 8000 Series I/O Family

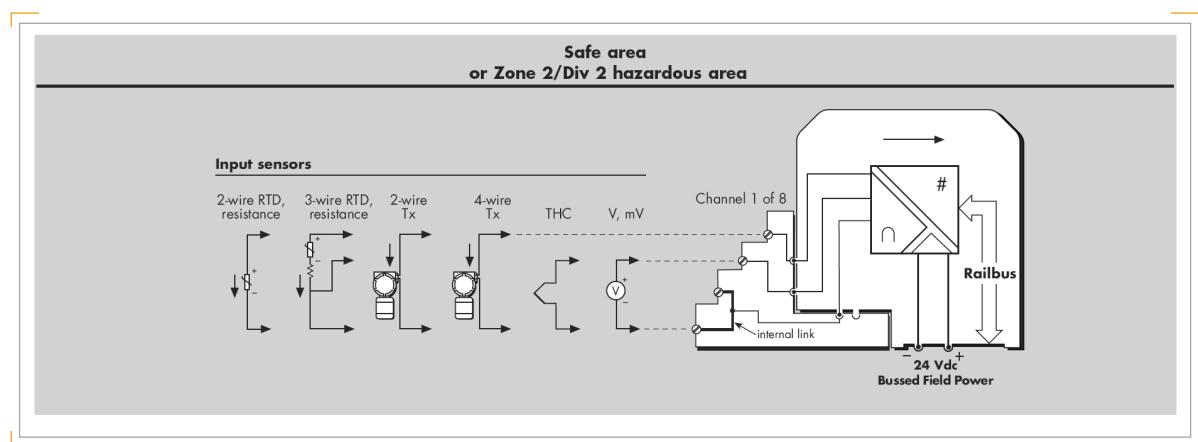
Resolution ..... 14 bits (typ.)  
 Optional open circuit bleed current .....  $\pm 1.2\mu\text{A}$  (nom.)  
 Open circuit detection time ..... 1 sec  
 ..... (with  $< 0.5\ \mu\text{F}$  cable capacitance)

#### RTD Input (2 or 3 Wire)

RTD types ..... Pt100, Pt200, Pt500, Cu10, Ni120; jPt100  
 Maximum wire resistance ..... 40 ohms  
 Calibration accuracy 3-wire  
   10°C to 40°C .....  $\pm 0.1\%$  of span  
   -40°C to 70°C .....  $\pm 0.2\%$  of span  
 RTD excitation current ..... selected for  $\sim 0.2\text{ mW}$  at 0°C  
 Resolution ..... 14 bits (typ.)  
 Open circuit detection time ..... 1 sec  
 ..... (with  $< 0.5\ \mu\text{F}$  cable capacitance)

#### Resistance Input (2 or 3 Wire)

Input resistance range (span) ..... 0 to 110, 280,  
 ..... 470 and 1000 ohms  
 Calibration accuracy 3-wire  
   10°C to 40°C .....  $\pm 0.2\%$  of span  
   -40°C to 70°C .....  $\pm 0.4\%$  of span  
 Maximum wire resistance ..... 40 ohms  
 Resistance excitation current ..... selected for  $\sim 1.0\text{ mW}$  at max R  
 Resolution ..... 14 bits (typ.)



$\dagger$  C J compensation located in recommended field terminal

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**8-channel Isolated Universal  
Analog Input**  
4-20mA with Thermocouple, RTD, Voltage

#### Voltage Input

Nominal signal range 1 (span) .....±120 mV, 0-1 V,  
.....0-5V, 1-5V, 0-10V, ±10V  
Resolution .....14 bits (typ.)

#### Configurable Parameters

Sensor type .....user selectable  
Input dead zone .....user defined value  
Channel status .....active/inactive  
Filter/sample rates .....user selectable

#### General Specifications

Common mode rejection (using 50/60Hz filter) .....> 120 dB @ 50/60 Hz  
Series mode rejection (using 50/60Hz filter) .....> 65 dB @ 50/60 Hz  
Maximum input voltage (except current I/P) .....± 25V  
Common mode voltage between channels .....250 V ac rms  
Isolation  
  (channel to channel) .....250 V ac rms  
  (any channel to Railbus) .....250 V ac rms  
  (any channel to Bussed Field Power) .....250 V ac rms  
  (Railbus to Bussed Field Power) .....150 V ac rms  
Input filter frequency response .....time constant 4 ms  
Input impedance .....> 1 M ohm  
Data Format .....0 to 66535 corresponds to selected span  
Open circuit detection .....< 1 sec  
.....(with < 0.5 µF cable capacitance)

#### Safety

FM non-incendive field wiring parameters (each channel)  
.....Voc=20 V; Isc = 75mA; Ca= 0.61 µF; La= 11.3mH

#### Power Supplies

Railbus (12V) current .....60 mA (typ.)  
.....125 mA (max.)  
Bussed Field Power @ 24 V dc ± 10%  
All configurations - except 4/20mA with excitation ..125 mA  
(max.)  
4/20mA with excitation .....300 mA (max.)

#### Mechanical

Module Key Code .....A1\*  
Module width .....42mm  
Weight .....185g

\* WARNING If this module is being used in an application that requires 250V ac rms channel-to-channel isolation, it must be replaced only with an A1 key code module that has equivalent, or better, channel-to-channel isolation rating.

#### Field Terminals

| Field Wiring | Recommended Field Terminal        | Compatible Field Terminal              |
|--------------|-----------------------------------|--|
| All Purpose  | NT-8608-FT-RT<br>(no internal CJ) | 8607-FT-TC (see note) (internal CJ)    |
| THC          | NT-8606-FT-TC<br>(internal CJ)    | 8608-FT-RT (see note) (no internal CJ) |

NOTE: For further advice on field terminals for this module and for operations with more than one type of sensor, see NovaTech 8000 I/O Hardware User's Guide



NT-8132-AI-UN

#### Contact:

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11500 Cronridge Dr., Suite 110  
Owings Mills, MD 21117  
T: 410.753.8300  
Toll Free: 800.253.3842  
[www.novatechweb.com](http://www.novatechweb.com)

- 4 thermocouple or mV\* input channels
- Cold junction compensation

#### Module Specifications

##### Inputs

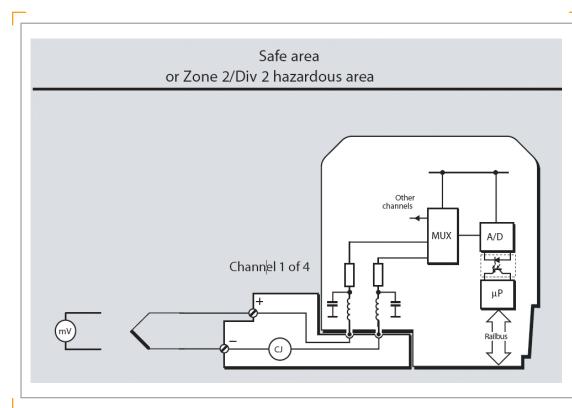
|   |   |
|---|---|
| Number of channels .....                                  | 4 |
| THCs types .....  |   |
| .....B,E,J,K,N,R,S, or T to EN 60584-2, IEC584-2, BS4937; |   |
| .....W3 and W5  |   |

##### Input Ranges

| Input Type       | Range             |
|------------------|-------------------|
| mV               | 0 to 120 mV       |
| Thermocouples: B | 0 to 1820 °C      |
| E                | -270 to + 1000 °C |
| J                | -210 to + 1200 °C |
| K & N            | -270 to + 1372 °C |
| R & S            | -50 to + 1768 °C  |
| T                | -270 to + 400 °C  |
| W3 & W5          | 0 to + 2315 °C    |

##### Calibration Accuracy

|   |                                     |
|---|-------------------------------------|
| mV input.....                             | ± 0.2% of span (- 40 to + 70 °C)    |
| .....                                     | .....± 0.1% of span(+10 to + 40 °C) |
| THC input .....                           | dependent on thermocouple type-     |
| Cold junction compensation error†.....    | <± 1 °C (-40 to + 70 °C)            |
| Resolution .....                          | 15 bits plus sign bit               |
| Common mode rejection.....                | > 80 dB @ 50/60 Hz                  |
| Series mode rejection.....                | > 40 dB @ 50/60 Hz                  |
| Maximum input voltage .....               | ± 4.0 V                             |
| Common mode voltage between channels..... | ± 4.5 V (max.)                      |
| Isolation (any channel to Railbus) .....  | 250 V ac rms                        |
| Open circuit bleed current.....           | ± 0.5 µA (nom.)                     |



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## 4-channel Analog Input Thermocouple and mV



NovaTech 8000 Series I/O Family

#### Configurable Parameters

|  |                              |
|--|------------------------------|
| Sensor type .....  | user selectable              |
| Input dead zone (hysteresis).....                                  | user defined value           |
| Selectable input filtering ....off / 2 reading avge./running avge. |                              |
| Drive on open circuit fault.....                                   | disabled /upscale /downscale |
| Channel status.....  | active/ inactive             |

#### Response Times

|  |               |
|--|---------------|
| Signal change to availability on Railbus ..... | 120 ms (min.) |
| .....  | 420 ms (max.) |
| O/C sensor detection.....                      | ≤ 10 s        |

#### Safety

|   |  |
|---|--|
| FM non-incendive field wiring parameters (each channel)     |  |
| .....Voc = 10.5 V; Isc = 3.6 mA; Ca = 14.9 µF; La = 1000 mH |  |

#### Power Supplies

|                            |               |
|----------------------------|---------------|
| Railbus (12V) current..... | 150 mA (typ.) |
| .....                      | 200 mA (max.) |
| Bussed Field Power .....   | not required  |

#### Mechanical

|                       |       |
|-----------------------|-------|
| Module Key Code ..... | C1    |
| Module width .....    | 42 mm |
| Weight.....           | 200 g |

#### Field Terminals

| Field Wiring                            | Recommended Field Terminal | Compatible Field Terminal |
|---|----------------------------|---------------------------|
| General Purpose                         | NT-8605-FT-TC THC          | -                         |
| Class 1, Div 2 or Zone 2 hazardous area | NT-8605-FT-TC THC          | -                         |

#### Contact:

|                                 |  |
|---------------------------------|--|
| NovaTech Process Solutions, LLC | T: 410.753.8300  |
| 11500 Cronridge Dr., Suite 110  | Toll Free: 800.253.3842                                      |
| Owings Mills, MD 21117          | <a href="http://www.novatechweb.com">www.novatechweb.com</a> |

- 4 RTD or resistance\* source inputs
- Function defined by configuration
- 2-, 3- or 4-wire RTD types accommodated

#### Module Specifications

##### Inputs

|                                       |   |
|---------------------------------------|---|
| Number of channels .....              | 4 |
| RTD input (2,3, or 4 wire)            |   |
| .....Pt100 to BS1904/DIN43760/IEC 75  |   |
| .....Ni120; jPt100 to JIS C1604: 1989 |   |

##### Input Ranges

| Input Type  | Range                             |
|-------------|-----------------------------------|
| Resistance  | Consult NovaTech for availability |
| RTDs: Pt100 | – 200 to + 850 °C                 |
| jPt100      | – 200 to + 510 °C                 |
| Ni120       | – 60 to + 320 °C                  |

Input resistance range (span).....0 to 500 Ω

##### Accuracy (% of span)

| Tamb           | (RTD & Ω inputs) |
|----------------|------------------|
| 25°C           | ± 0.05%          |
| +10 to + 40°C  | ± 0.1%           |
| – 40 to + 70°C | ± 0.2%           |

RTD excitation current .....200 μA (nom.)

Resolution .....15 bits plus sign bit

Common mode rejection.....> 80 dB @ 50/60 Hz

Series mode rejection.....> 40 dB @ 50/60 Hz

Isolation (any channel to Railbus) .....250 V ac rms

Open circuit bleed current.....0.5 μA (nom.)

## 4-channel Analog Input RTD and Ω



NovaTech 8000 Series I/O Family

#### Configurable Parameters

|  |                    |
|--|--------------------|
| Sensor type.....   | user selection     |
| Input deadzone .....   | user defined value |
| Selectable input filtering....off /2-reading avge./running avge. |                    |
| Drive on open circuit fault.....                                 | disabled /upscale  |
| Channel status.....  | active/ inactive   |
| Offset (2-wire RTD mode).....                                    | user defined value |

#### Response Times

|  |               |
|--|---------------|
| Signal change to availability on Railbus ..... | 180 ms (min.) |
| .....  | 840 ms (max.) |
| O/C sensor detection.....                      | ≤ 10 s        |

#### Safety

FM non-incendive field wiring parameters (each channel)  
..... $V_{oc} = 10.5$  V;  $I_{sc} = 3.6$  mA;  $C_a = 14.9$  μF;  $L_a = 1000$  mH

#### Power Supplies

|                            |               |
|----------------------------|---------------|
| Railbus (12V) current..... | 150 mA (typ.) |
| .....                      | 200 mA (max.) |
| Bussed Field Power .....   | not required  |

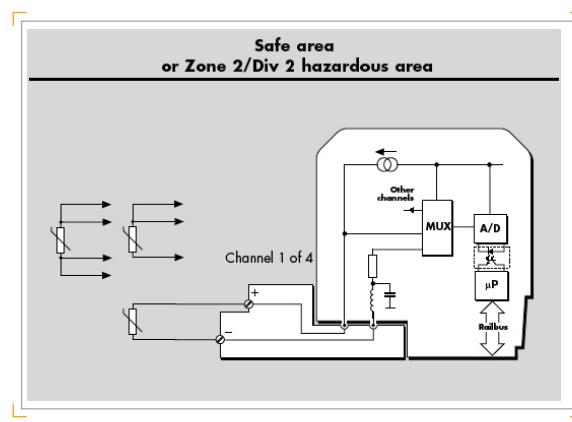
#### Mechanical

|                       |       |
|-----------------------|-------|
| Module Key Code ..... | C1    |
| Module width .....    | 42 mm |
| Weight.....           | 200 g |

#### Field Terminals

| Field Wiring                                    | Recommended Field Terminal | Compatible Field Terminal |
|---|----------------------------|---------------------------|
| General Purpose                                 | NT-8606-FT-RT<br>RTD       | -                         |
| Class 1, Div 2<br>or Zone 2 hazard-<br>ous area | NT-8606-FT-RT<br>RTD       | -                         |

\*Consult NovaTech for availability.



#### Contact:

- 8 single-ended 4-20 mA output channels
- Non-incendive field circuits
- HART pass-through
- HART variable and status reporting
- Valve positioners and remote indicators, etc.
- Open circuit detection on each channel
- 24 V dc bussed field power required

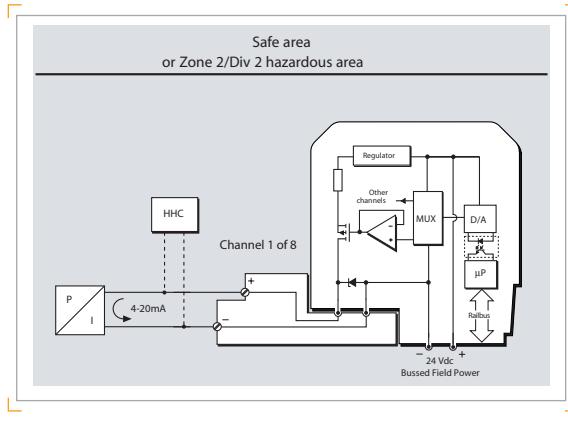
### Module Specifications

#### Inputs

- Number of channels ..... 8, single-ended  
 Nominal signal range (span) ..... 4 to 20 mA  
 Full signal range ..... 1 to 23 mA  
 Open loop detection threshold .....  $0.7 \pm 0.25$  mA  
 Output compliance ..... 20 mA at 21.6 V dc supply  
 ..... (into  $700 \Omega$  load)  
 Accuracy (over temp range) .....  $\pm 0.25\%$  of span  
 Resolution ..... 12 bits  
 Isolation  
 (any channel to Railbus) ..... 100 V ac  
 (between channels) ..... none

#### Configurable Parameters

- Initialization state ..... predefined value  
 Drive on fail-safe ..... predefined value/last value  
 Channel status ..... active /inactive  
 HART variable and status reporting ..... enable /disable



## 8 Channel Analog Output

4-20 mA with HART®



NovaTech 8000 Series I/O Family

#### Response Time

- Signal change to availability on Railbus  
 4-20 mA mode ..... 25 ms (max.)  
 HART mode ..... 0.75 s per channel

#### Safety

- FM non-incendive field wiring parameters (each channel)  
 .....  $V_{oc} = 28.7$  V;  $I_{sc} = 33$  mA;  $C_a = 0.17 \mu F$ ;  $L_a = 11.0$  mH

#### Power Supplies

- Railbus (12V) current ..... 100 mA (typ.)  
 ..... 150 mA (max.)  
 Bussed Field Power ..... 300 mA (max.) at 24 Vdc  $\pm 10\%$

#### Mechanical

- Module Key Code ..... A4  
 Module width ..... 42 mm  
 Weight ..... 200 g

#### Field Terminals

| Field Wiring                            | Recommended Field Terminal  | Compatible Field Terminal   |
|---|-----------------------------|-----------------------------|
| General Purpose                         | NT-8602-FT-ST Standard      | NT-8604-FT-FU Fused         |
| Class 1, Div 2 or Zone 2 hazardous area | NT-8601-FT-NI Non-incendive | NT-8603-FT-FU Non-incendive |

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[www.novatechweb.com](http://www.novatechweb.com)

- **8 single-ended outputs**
- **4-20 mA**
- **For I/P converters and remote indicators, etc**
- **Open circuit detection is provided on each channel**
- **24 V dc bussed field power required**

### Module Specifications

#### Outputs

- Number of channels ..... 8, single-ended  
 Nominal signal range (span) ..... 4 to 20 mA  
 Full signal output range ..... 1 to 23 mA  
 Open loop detection threshold .....  $0.7 \pm 0.25$  mA  
 Output compliance ..... 20 mA at 21.6 V dc supply (into  $700 \Omega$  load)  
 Accuracy (over temp range) .....  $\pm 0.25\%$  of span  
 Output ripple ..... < 0.02% of span  
 Resolution ..... 12 bits  
 Isolation  
 any channel to Railbus ..... 100 V ac

#### Configurable Parameters

- Initialization state ..... predefined value  
 Drive on fail-safe ..... predefined value / last value  
 Channel status ..... active / inactive

#### Response time

- From Railbus command to output change ..... 25 ms (max.)

#### Safety

- FM non-incendive field wiring parameters (each channel)  
 $V_{oc} = 28.7$  V;  $I_{sc} = 33$  mA;  $C_a = 0.17 \mu F$ ;  $L_a = 11.0$  mH

#### Power Supplies

- Railbus (12V) current ..... 100 mA (typ.)  
 ..... 150 mA (max.)  
 Bussed Field Power ..... 300 mA (max.) @ 24 V dc  $\pm 10\%$   
 Quiescent current ..... 60 mA

## 8-channel Analog Output 4-20 mA



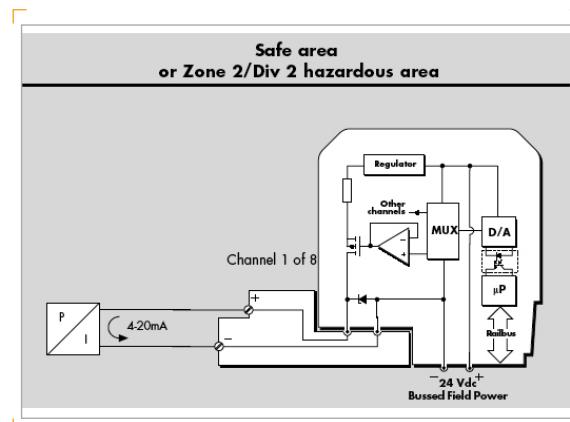
NovaTech 8000 Series I/O Family

#### Mechanical

- Module Key Code ..... A4  
 Module width ..... 42 mm  
 Weight ..... 200 g

#### Field Terminals

| Field Wiring                            | Recommended Field Terminal  | Compatible Field Terminal         |
|---|-----------------------------|-----------------------------------|
| General Purpose                         | NT-8602-FT-ST Standard      | NT-8604-FT-FU Fused               |
| Class 1, Div 2 or Zone 2 hazardous area | NT-8601-FT-NI Non-incendive | NT-8603-FT-FU Non-incendive Fused |



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- **8 discrete isolated inputs**
- **24 V dc field voltage sources**
- **User definable input threshold**
- **Pulse counting option**

#### Module Specifications

##### Inputs

|   |                         |
|---|-------------------------|
| Number of channels .....                        | 8                       |
| OFF voltage.....                                | < 3.2 V dc              |
| ON voltage .....                                | > 11 V dc               |
| Wetting current .....                           | 6.3 mA (nom.) @ 24 V dc |
| Minimum pulse width detected .....              | 3 ms                    |
| Maximum switching frequency (no-filtering)..... | 200 Hz                  |
| Maximum voltage                                 |                         |
| Input .....                                     | 30 V dc                 |
| Reverse input.....                              | - 25 V dc               |

##### Configurable Parameters

|                               |  |
|-------------------------------|--|
| Selectable input filter ..... | fast, slow or user defined<br>(User defined permits 0 to 512 ms values in 2ms steps) |
| Latch inputs.....             | enable / disable   |
| Latch polarity.....           | latch on high / latch on low   |
| Pulse counting .....          | enable / disable   |

##### Response Time

|   |             |
|---|-------------|
| I/O response time                                 |             |
| Field event to new data available on Railbus..... | 3 ms (max.) |

##### Safety

|   |  |
|---|--|
| FM non-incendive field wiring parameters (each channel)                     |  |
| ..... $V_{max} = 30$ V; $I_{max} = 100$ mA; $C_i = 0$ $\mu$ F; $L_i = 0$ mH |  |

##### Power Supplies

|                            |              |
|----------------------------|--------------|
| Railbus (12V) current..... | 35 mA (typ.) |
| .....                      | 55 mA (max.) |
| Bussed Field Power .....   | not required |

## 8-channel Discrete Input

24 V dc, isolated, sinking



NovaTech 8000 Series I/O Family

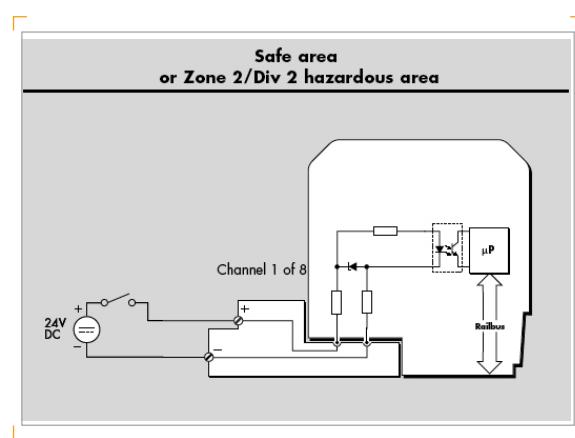
##### Mechanical

|                      |       |
|----------------------|-------|
| Module Key Code..... | B2    |
| Module width .....   | 42 mm |
| Weight.....          | 170 g |

##### Field Terminals

| Field Wiring                            | Recommended Field Terminal | Compatible Field Terminal      |
|---|----------------------------|--------------------------------|
| General Purpose                         | NT-8602-FT-ST Standard †   | NT-8604-FT-FU Fused            |
| Class 1, Div 2 or Zone 2 hazardous area | NT-8601-FT-NA Non-arcng †  | NT-8611-FT-FU Non-arcng, Fused |

† External fusing of the Field Power supply is recommended in order to protect the field wiring.



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[www.novatechweb.com](http://www.novatechweb.com)

- 8 discrete inputs for dry contact switches
  - 24 V dc provided on input high side
  - Returns commoned internally
  - Pulse counting option
  - 24 V dc bussed field power required

## Module Specifications

## Inputs

|   |             |
|---|-------------|
| Number of channels .....                        | 8           |
| OFF current .....                               | < 0.69 mA   |
| ON current .....                                | > 2.24 mA   |
| Wetting current .....                           | 5 mA (typ.) |
| Minimum pulse width detected .....              | 3 ms        |
| Maximum switching frequency (no-filtering)..... | 200 Hz      |
| Isolation (any channel to Railbus) .....        | 250 V ac    |

## Configurable Parameters

- Selectable input filter .....fast, slow or user defined  
(User defined permits 0 to 512 ms values in 2ms steps)
- Latch inputs.....enable /disable
- Latch polarity.....latch on high / latch on low
- Pulse counting .....enable /disable

## Response Time

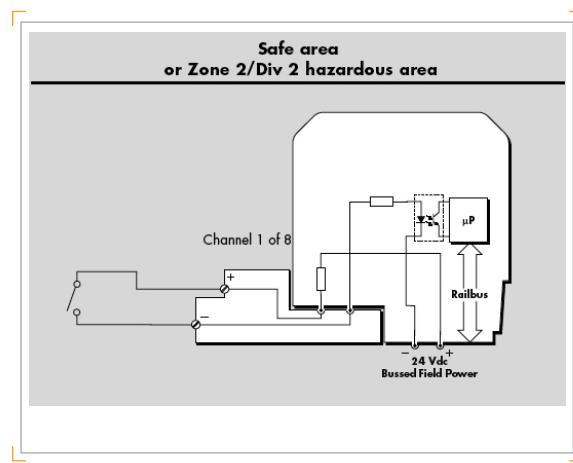
I/O response time  
Field event to new data available on Railbus.....3 ms (max.)

## Safety

FM non-incendive field wiring parameters (each channel)

## Power Supplies

Railbus (12V) current.....35 mA (typ.)  
.....55 mA (max.)  
Bussed Field Power .....40 mA, @ 18–36 V dc



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NovaTech 8000 Series I/O Family

## Mechanical

Module Key Code..... B1  
Module width ..... 42 mm  
Weight..... 170 g

## Field Terminals

| Field Wiring                                    | Recommended Field Terminal       | Compatible Field Terminal                |
|---|----------------------------------|--|
| General Purpose                                 | NT-8602-FT-ST<br>Standard †      | NT-8604-FT-FU                            |
| Class 1, Div 2<br>or Zone 2 hazard-<br>ous area | NT-8601-FT-NI<br>Non-incendive † | NT-8603-FT-FU<br>Non-incendive,<br>fused |

† External fusing of the field power supply is recommended in order to protect the field wiring.

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- **16 input channels for dry contact switches**
- **24 V dc provided on input high side**
- **Returns commoned internally**
- **Pulse counting option**
- **24 V dc bussed field power required**

### Module Specifications

#### Inputs

|   |               |
|---|---------------|
| Number of channels .....                            | 16            |
| OFF current .....                                   | < 0.3 mA      |
| ON current.....                                     | > 1.2 mA      |
| Wetting current .....                               | 2.8 mA (typ.) |
| Minimum pulse width detected .....                  | 5 ms          |
| Max input freq in pulse counting mode (no-debounce) | 100 Hz        |
| Isolation (any channel to Railbus) .....            | 250 V ac      |

#### Configurable Parameters

|                               |  |
|-------------------------------|--|
| Selectable input filter ..... | fast, slow or user defined<br>(User defined permits 0 to 512 ms values in 2ms steps) |
| Latch inputs.....             | enable /disable  |
| Latch polarity.....           | latch on high / latch on low   |
| Pulse counting .....          | enable /disable  |

#### Response Time

|   |             |
|---|-------------|
| I/O response time                                 |             |
| Field event to new data available on Railbus..... | 5 ms (max.) |

#### Safety

FM non-incendive field wiring parameters (each channel)  
 $V_{oc} = 30 V$ ;  $I_{sc} = 3.5 \text{ mA}$ ;  $C_a = 0.12 \mu\text{F}$ ;  $L_a = 1000 \text{ mH}$

#### Power Supplies

|                            |                     |
|----------------------------|---------------------|
| Railbus (12V) current..... | 90 mA (typ.)        |
| .....                      | 135 mA (max.)       |
| Bussed Field Power.....    | 60 mA, @ 18–30 V dc |



### 16-channel Discrete Input

24 V dc, non-isolated, module-powered



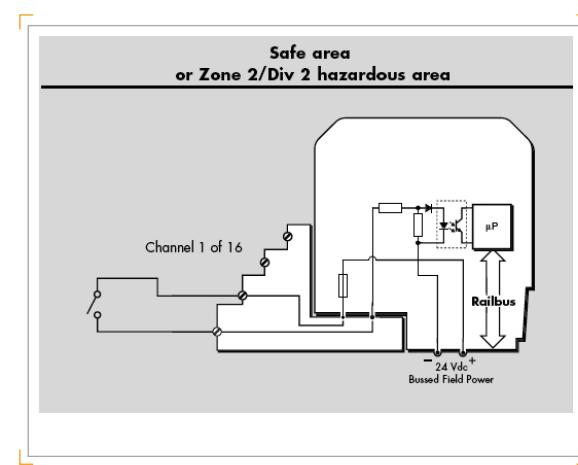
NovaTech 8000 Series I/O Family

#### Mechanical

|                      |       |
|----------------------|-------|
| Module Key Code..... | E1    |
| Module width .....   | 42 mm |
| Weight.....          | 210 g |

#### Field Terminals

| Field Wiring                               | Recommended Field Terminal     | Compatible Field Terminal |
|--|--------------------------------|---------------------------|
| General Purpose                            | NT-8617-FT-NI<br>16 channel DI | -                         |
| Class 1, Div 2<br>or Zone 2 hazardous area | NT-8617-FT-NI<br>16 channel DI | -                         |



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[www.novatechweb.com](http://www.novatechweb.com)

- **16 input channels**
- **24 V dc field voltage sources**
- **Individually isolated channels**
- **User definable input threshold**
- **Pulse counting option**

### Module Specifications

#### Inputs

|   |                         |
|---|-------------------------|
| Number of channels .....                            | 16                      |
| OFF voltage.....                                    | < 3.4 V dc              |
| ON voltage .....                                    | > 11 V dc               |
| Wetting current .....                               | 2.8 mA (nom.) @ 24 V dc |
| Minimum pulse width detected .....                  | 5 ms                    |
| Max input freq in pulse counting mode (no-debounce) | 100 Hz                  |
| Maximum voltage                                     |                         |
| Input .....   | 30 V dc                 |
| Reverse input .....                                 | - 25 V dc               |
| Isolation (Any Channel to railbus) .....            | 250 V ac                |
| Isolation (channel to channel) .....                | 150 V peak              |

#### Configurable Parameters

|                               |  |
|-------------------------------|--|
| Selectable input filter ..... | fast, slow or user defined<br>(User defined permits 0 to 512 ms values in 2ms steps) |
| Pulse counting .....          | enable / disable   |

#### Response Time

|  |             |
|--|-------------|
| I/O response time .....                        | 5 ms (max.) |
| (Field event to new data available on Railbus) |             |

#### Safety

|  |  |
|--|--|
| FM non-incendive field wiring parameters (each channel)                      |  |
| ..... $V_{max} = 30 V$ ; $I_{max} = 100 mA$ ; $C_i = 0 \mu F$ ; $L_i = 0 mH$ |  |



### 16-channel Discrete Input

24 V dc, isolated, sinking



NovaTech 8000 Series I/O Family

#### Power Supplies

|                            |               |
|----------------------------|---------------|
| Railbus (12V) current..... | 90 mA (typ.)  |
| .....                      | 135 mA (max.) |
| Bussed Field Power .....   | not required  |

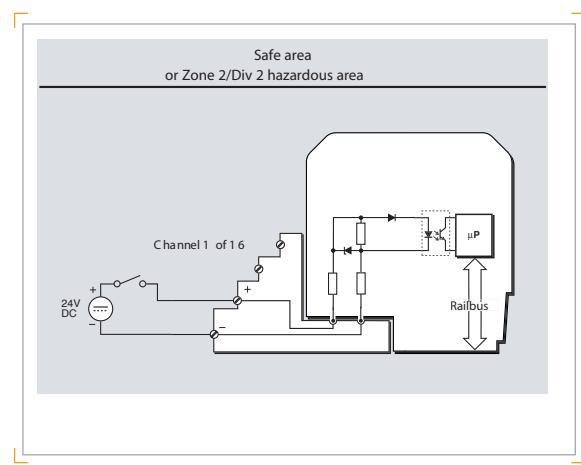
#### Mechanical

|                       |        |
|-----------------------|--------|
| Module Key Code ..... | E2     |
| Module width .....    | .42 mm |
| Weight.....           | 210 g  |

#### Field Terminals

| Field Wiring                               | Recommended Field Terminal       | Compatible Field Terminal |
|--|----------------------------------|---------------------------|
| General Purpose                            | NT-8617-FT-NI †<br>16 channel DI | -                         |
| Class 1, Div 2<br>or Zone 2 hazardous area | NT-8617-FT-NI †<br>16 channel DI | -                         |

† External fusing of the Field Power supply is recommended in order to protect the field wiring.



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- 8 discrete inputs**
- 115 V ac field voltage sources**
- User definable input threshold**
- Pulse counting option**

#### Module Specifications

##### Inputs

|                          |                        |
|--------------------------|------------------------|
| Number of channels ..... | 8                      |
| OFF voltage.....         | < 34 V ac              |
| ON voltage .....         | > 84 V ac              |
| Wetting current .....    | 2 mA (nom.) @ 115 V ac |
| Max. input voltage ..... | 130 V ac               |
| Frequency .....          | 50 / 60 Hz             |

##### Configurable Parameters

|                               |  |
|-------------------------------|--|
| Selectable input filter ..... | fast, slow or user defined<br>(User defined permits 0 to 512 ms values in 2ms steps) |
| Latch inputs.....             | enable / disable   |
| Latch polarity.....           | latch on high / latch on low   |
| Pulse counting .....          | enable / disable   |

##### Response Time

###### I/O response time

Field event to new data available on Railbus....33 ms (max.)

##### Power Supplies

|                            |              |
|----------------------------|--------------|
| Railbus (12V) current..... | 40 mA (typ.) |
| .....                      | 60 mA (max.) |
| Bussed Field Power .....   | not required |

##### Mechanical

|                      |       |
|----------------------|-------|
| Module Key Code..... | E4    |
| Module width .....   | 42 mm |
| Weight.....          | 170 g |

 **8-channel Discrete Input**  
115 V ac, isolated, sinking

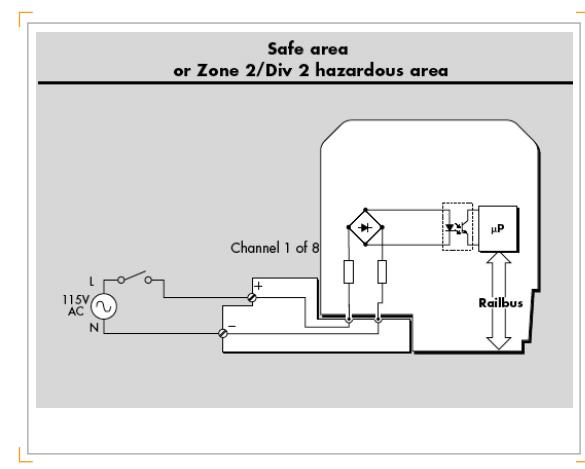


NovaTech 8000 Series I/O Family

##### Field Terminals

| Field Wiring                            | Recommended Field Terminal  | Compatible Field Terminal        |
|---|-----------------------------|----------------------------------|
| General Purpose                         | NT-8602-FT-ST Standard †    | NT-8604-FT-FU Fused              |
| Class 1, Div 2 or Zone 2 hazardous area | NT-8610-FT-NA Non-arching † | NT-8611-FT-FU Non-arching, fused |

† External fusing of the Field Power supply is recommended in order to protect the field wiring.



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Toll Free: 800.253.3842  
[www.novatechweb.com](http://www.novatechweb.com)

- **8 discrete inputs for dry contact switches**
- **115 V ac provided on input high side**
- **Returns commoned internally**
- **Pulse counting option**
- **115 V ac Bussed Field Power required**

### Module Specifications

#### Inputs

|                          |                        |
|--------------------------|------------------------|
| Number of channels ..... | 8                      |
| OFF current .....        | < 0.56 mA              |
| ON current.....          | > 1.4 mA               |
| Wetting current .....    | 2 mA (nom.) @ 115 V ac |

#### Configurable Parameters

|                               |  |
|-------------------------------|--|
| Selectable input filter ..... | fast, slow or user defined<br>(User defined permits 0 to 512 ms values in 2ms steps) |
| Latch inputs.....             | enable / disable   |
| Latch polarity.....           | latch on high / latch on low   |
| Pulse counting .....          | enable / disable   |

#### Response Time

##### I/O response time

Field event to new data available on Railbus....33 ms (max.)

#### Power Supplies

|                            |               |
|----------------------------|---------------|
| Railbus (12V) current..... | 40 mA (typ.)  |
| .....                      | .60 mA (max.) |
| Bussed Field Power .....   | 115 V ac ±10% |
| Frequency .....            | 50 / 60 Hz    |

#### Mechanical

|                      |       |
|----------------------|-------|
| Module Key Code..... | E1    |
| Module width .....   | 42 mm |
| Weight.....          | 170 g |

### 8-channel Discrete Input

115 V ac, non-isolated, module powered

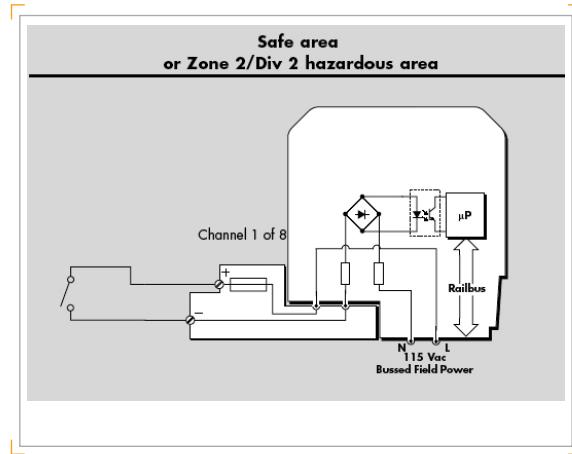


NovaTech 8000 Series I/O Family

#### Field Terminals

| Field Wiring                                    | Recommended Field Terminal            | Compatible Field Terminal     |
|---|---------------------------------------|-------------------------------|
| General Purpose                                 | NT-8604-FT-FU<br>Fused                | NT-8602-FT-ST<br>Standard †   |
| Class 1, Div 2<br>or Zone 2 hazard-<br>ous area | NT-8611-FT-FU<br>Non-arcing,<br>Fused | NT-8610-FT-NA<br>Non-arcing † |

† Alternative fusing in the field wiring is recommended if it is not provided in the field terminal.



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- **8 discrete isolated inputs**
- **230 V ac field voltage sources**
- **User definable input threshold**
- **Pulse counting option**

#### Module Specifications

##### Inputs

|                          |                        |
|--------------------------|------------------------|
| Number of channels ..... | 8                      |
| OFF voltage.....         | < 68 V ac              |
| ON voltage .....         | > 168 V ac             |
| Wetting current .....    | 1 mA (nom.) @ 230 V ac |
| Max. input voltage ..... | 265 V ac               |
| Frequency .....          | 50 / 60 Hz             |

##### Configurable Parameters

|                               |  |
|-------------------------------|--|
| Selectable input filter ..... | fast, slow or user defined<br>(User defined permits 0 to 512 ms values in 2ms steps) |
| Latch inputs.....             | enable / disable   |
| Latch polarity.....           | latch on high / latch on low   |
| Pulse counting .....          | enable / disable   |

##### Response Time

###### I/O response time

Field event to new data available on Railbus....33 ms (max.)

##### Power Supplies

|                            |              |
|----------------------------|--------------|
| Railbus (12V) current..... | 40 mA (typ.) |
| .....                      | 60 mA (max.) |
| Bussed Field Power .....   | not required |

##### Mechanical

|                      |       |
|----------------------|-------|
| Module Key Code..... | E5    |
| Module width .....   | 42 mm |
| Weight.....          | 170 g |

## 8-channel Discrete Input 230 V ac, isolated, sinking

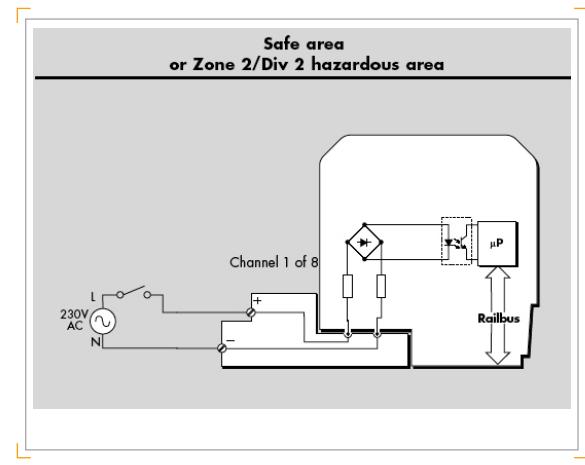


NovaTech 8000 Series I/O Family

#### Field Terminals

| Field Wiring                            | Recommended Field Terminal | Compatible Field Terminal       |
|---|----------------------------|---------------------------------|
| General Purpose                         | NT-8602-FT-ST Standard †   | NT-8604-FT-FU Fused             |
| Class 1, Div 2 or Zone 2 hazardous area | NT-8610-FT-NI Non-arcing † | NT-8611-FT-FU Non-arcing, fused |

† External fusing of the Field Power supply is recommended in order to protect the field wiring.



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- **8 discrete inputs for dry contact switches**
- **230 V ac provided on input high side**
- **Returns commoned internally**
- **Pulse counting option**
- **230 V ac Bussed Field Power required**

#### Module Specifications (See also System Specification)

##### Inputs

Number of channels .....8  
 OFF current .....< 0.28 mA  
 ON current.....> 0.71 mA  
 Wetting current .....1 mA (nom.) @ 230 V ac

##### Configurable Parameters

Selectable input filter .....fast, slow or user defined  
 (User defined permits 0 to 512 ms values in 2ms steps)  
 Latch inputs.....enable / disable  
 Latch polarity.....latch on high / latch on low  
 Pulse counting .....enable / disable

##### Response Time

I/O response time  
 Field event to new data available on Railbus....33 ms (max.)

##### Power Supplies

Railbus (12V) current.....40 mA (typ.)  
 .....60 mA (max.)  
 Bussed Field Power .....207 to 265 V ac  
 Frequency .....50 / 60 Hz

##### Mechanical

Module Key Code.....E2  
 Module width .....42 mm  
 Weight.....170 g

## 8-channel Discrete Input

230 V ac, non-isolated, module powered

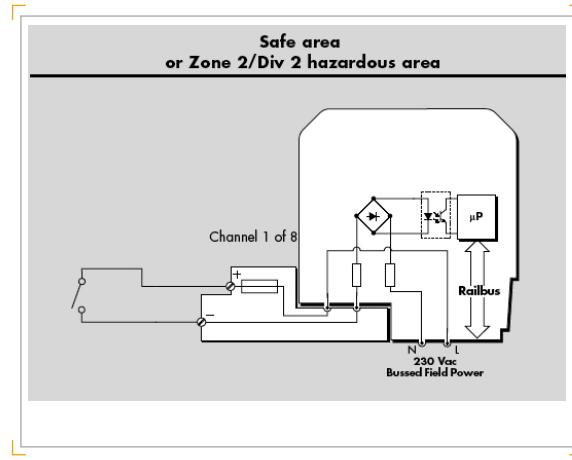


NovaTech 8000 Series I/O Family

##### Field Terminals

| Field Wiring                               | Recommended Field Terminal            | Compatible Field Terminal     |
|--|---------------------------------------|-------------------------------|
| General Purpose                            | NT-8604-FT-FU<br>Fused                | NT-8602-FT-ST<br>Standard †   |
| Class 1, Div 2<br>or Zone 2 hazardous area | NT-8611-FT-FU<br>Non-arcing,<br>Fused | NT-8610-FT-NA<br>Non-arcing † |

† Alternative fusing in the field wiring is recommended if it is not provided in the field terminal.



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- **8 powered outputs**
- **Controls solenoids and relays**
- **Common load supply of up to 60 V dc**
- **Discrete or pulsed outputs**
- **1A per channel switched current**
- **2-60 V dc bussed field power required**

#### Module Specifications

##### Outputs

|                                 |               |
|---------------------------------|---------------|
| Number of channels .....        | 8             |
| Output voltage range.....       | 2-60 V dc     |
| ON voltage drop.....            | 0.25 V (max.) |
| OFF leakage current .....       | 1.0 mA (max.) |
| Switched current per channel †† |               |
| Continuous *.....               | 1 A           |
| For < 100 ms.....               | 4 A           |
| For < 20 ms.....                | 6 A           |

##### Configurable Parameters

|                                  |  |
|----------------------------------|--|
| Output initialization state..... | predefined value                         |
| Fail-safe.....                   | predefined value/last value              |
| Output .....                     | discrete, momentary or continuous pulse‡ |
| Pulse width.....                 | 2 ms to 130 s                            |

##### Response Time

###### Response time

From Railbus command to output change .....1 ms (max.)

##### Power Supplies

|                            |              |
|----------------------------|--------------|
| Railbus (12V) current..... | 45 mA (typ.) |
| .....                      | 70 mA (max.) |
| Bussed Field Power .....   | 2 to 60 V dc |

 **8-channel Discrete Output**  
2-60 V dc, non-isolated, module powered



NovaTech 8000 Series I/O Family

##### Mechanical

|                      |       |
|----------------------|-------|
| Module Key Code..... | B6    |
| Module width .....   | 42 mm |
| Weight.....          | 200 g |

##### Field Terminals

| Field Wiring                                    | Recommended Field Terminal           | Compatible Field Terminal    |
|---|--------------------------------------|------------------------------|
| General Purpose                                 | NT-8604-FT-FU<br>Fused               | NT-8602-FT-ST<br>Standard †  |
| Class 1, Div 2<br>or Zone 2 hazard-<br>ous area | NT-8611-FT-FU<br>Non-arcng,<br>Fused | NT-8610-FT-NA<br>Non-arcng † |

† Alternative fusing in the field wiring is recommended if it is not provided in the field terminal.

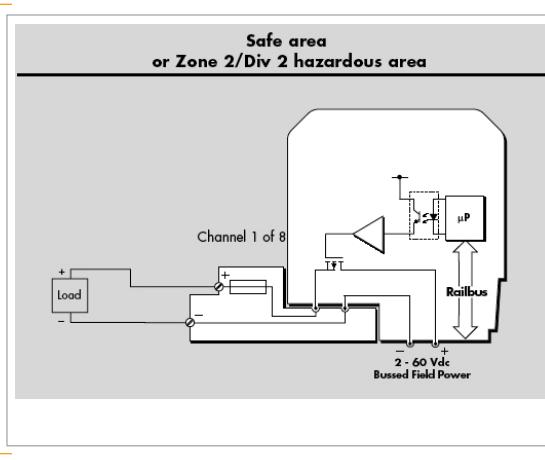
†† The total instantaneous switched current should not exceed the following:

10 A for < 100 ms

18 A for < 20 ms

\*Limited to 6 A per module

‡Consult NovaTech for availability



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[www.novatechweb.com](http://www.novatechweb.com)

- **8 fully isolated semiconductor switched outputs**
- **Controls solenoids and relays**
- **For load supplies of up to 60 V dc**
- **Discrete or pulsed outputs**
- **1A per channel switched**

### Module Specifications

#### Outputs

|                              |               |
|------------------------------|---------------|
| Number of channels .....     | 8             |
| Output voltage range.....    | 2-60 V dc     |
| ON voltage drop.....         | 0.25 V (max.) |
| OFF leakage current .....    | 1.0 mA (max.) |
| Switched current per channel |               |
| Continuous.....              | 1 A           |
| For < 100ms .....            | 4 A           |
| For < 20ms .....             | 6 A           |

#### Configurable Parameters

|                                  |  |
|----------------------------------|--|
| Output initialization state..... | predefined value                         |
| Fail-safe.....                   | predefined value/last value              |
| Output .....                     | discrete, momentary or continuous pulse† |
| Pulse width.....                 | 2 ms to 130 s                            |

#### Response Time

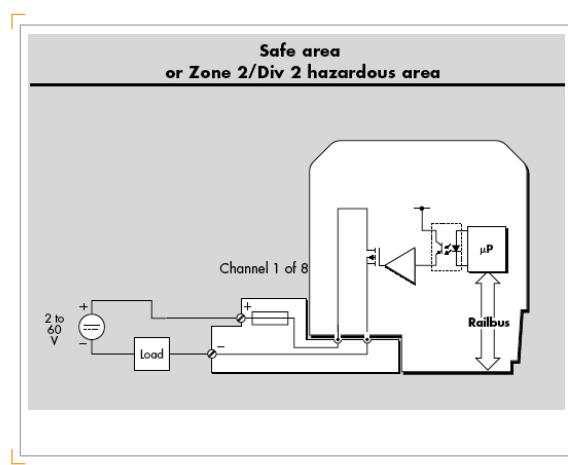
|   |             |
|---|-------------|
| Response time                               |             |
| From Railbus command to output change ..... | 3 ms (max.) |

#### Power Supplies

|                            |               |
|----------------------------|---------------|
| Railbus (12V) current..... | .45 mA (typ.) |
| .....                      | 70 mA (max.)  |
| Bussed Field Power .....   | hot required  |

#### Mechanical

|                      |       |
|----------------------|-------|
| Module Key Code..... | .B5   |
| Module width .....   | 42 mm |
| Weight.....          | 200 g |



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 **8-channel Discrete Output**  
2-60 V dc, isolated, unpowered



NovaTech 8000 Series I/O Family

#### Field Terminals

| Field Wiring                                    | Recommended Field Terminal           | Compatible Field Terminal  |
|---|--------------------------------------|----------------------------|
| General Purpose                                 | NT-8604-FT-FU<br>Fused               | NT-8602-FT-ST<br>Standard  |
| Class 1, Div 2<br>or Zone 2 hazard-<br>ous area | NT-8611-FT-FU<br>Non-arcng,<br>Fused | NT-8610-FT-NA<br>Non-arcng |

Note: External fusing to protect field wiring is recommended.

†Consult NovaTech for availability.

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- **8 powered outputs**
- **Controls solenoids and relays**
- **Common load supply of up to 265 V ac**
- **Discrete or pulsed outputs**
- **1A per channel maximum**
- **20-265 V ac bussed field power required**

### Module Specifications

#### Outputs

|                                   |             |
|-----------------------------------|-------------|
| Number of channels .....          | 8           |
| Output voltage range.....         | 20-265 V ac |
| Frequency .....                   | 50 / 60 Hz  |
| ON voltage drop.....              | < 1.2 V     |
| OFF leakage current .....         | < 4mA       |
| Switched current per channel †    |             |
| Continuous.....                   | 1 A*        |
| For < 100 ms.....                 | 5 A         |
| For < 20 ms.....                  | 20 A        |
| Minimum load current, per channel |             |
| @ 115 V ac.....                   | 11 mA       |
| @ 230 V ac.....                   | .5 mA       |

#### Configurable Parameters

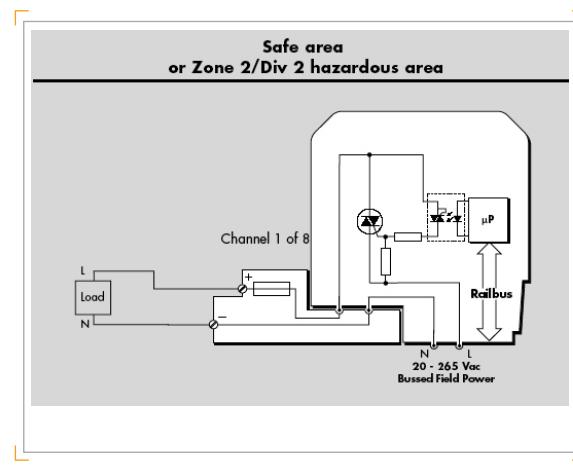
|                                  |  |
|----------------------------------|--|
| Output initialization state..... | predefined value                         |
| Fail-safe.....                   | predefined value/last value              |
| Output .....                     | discrete, momentary or continuous pulse‡ |
| Pulse width.....                 | 2 ms to 130 s                            |

#### Response Time

Response time (max.) ..2 ms + 1/2 cycle of mains frequency  
(From Railbus command to output change)

#### Power Supplies

|                                   |                |
|-----------------------------------|----------------|
| Railbus (12V) current.....        | 75 mA (typ.)   |
| .....                             | 125mA (max.)   |
| Bussed Field Power (voltage)..... | 20 to 265 V ac |



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 **8-channel Discrete Output**  
20-265 V ac, non-isolated, module powered



NovaTech 8000 Series I/O Family

#### Mechanical

|                       |       |
|-----------------------|-------|
| Module Key Code ..... | F1    |
| Module width .....    | 42 mm |
| Weight.....           | 220 g |

#### Field Terminals

| Field Wiring                               | Recommended Field Terminal            | Compatible Field Terminal     |
|--|---------------------------------------|-------------------------------|
| General Purpose                            | NT-8604-FT-FU<br>Fused                | NT-8602-FT-ST<br>Standard †   |
| Class 1, Div 2<br>or Zone 2 hazardous area | NT-8611-FT-FU<br>Non-arcing,<br>Fused | NT-8610-FT-NA<br>Non-arcing † |

† Alternative fusing in the field wiring is recommended if it is not provided in the field terminal.

†† Stated figures are for operation with unfused field terminal. When operating with 2 A fused field terminal part no.

NT-8604-FT-FU, maximum switched current is 5 A inrush for <10 ms pulse width at 0.1% duty cycle and <108 operations

\*Limited to 3 A per module.

‡Consult NovaTech for availability

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- **8 fully isolated semiconductor switched outputs**
- **Controls solenoids and relays**
- **For load supplies of up to 250 V ac**
- **Discrete or pulsed outputs**
- **1A per channel switched**

#### Module Specifications

##### Outputs

|                                   |             |
|-----------------------------------|-------------|
| Number of channels .....          | 8           |
| Output voltage range.....         | 20–265 V ac |
| Frequency .....                   | 50 / 60 Hz  |
| ON voltage drop.....              | < 1.2 V     |
| OFF leakage current .....         | < 4 mA      |
| Switched current per channel †    |             |
| Continuous.....                   | 1 A*        |
| For < 100ms .....                 | 5 A         |
| For < 20ms .....                  | 20 A        |
| Minimum load current, per channel |             |
| @ 115 V ac.....                   | 11 mA       |
| @ 230 V ac.....                   | .5 mA       |

##### Configurable Parameters

|                                  |  |
|----------------------------------|--|
| Output initialization state..... | predefined value                         |
| Fail-safe.....                   | predefined value/last value              |
| Output .....                     | discrete, momentary or continuous pulse‡ |
| Pulse width.....                 | 2 ms to 130 s                            |

##### Response Time

Response time (max.) ..2 ms + 11/42 cycle of mains frequency  
(From Railbus command to output change)

##### Power Supplies

|                            |               |
|----------------------------|---------------|
| Railbus (12V) current..... | 75 mA (typ.)  |
| .....                      | 125 mA (max.) |
| Bussed Field Power .....   | not required  |

 **8-channel Discrete Output**  
20–265 V ac, isolated, unpowered



NovaTech 8000 Series I/O Family

##### Mechanical

|                       |        |
|-----------------------|--------|
| Module Key Code ..... | F4     |
| Module width .....    | .42 mm |
| Weight.....           | 220 g  |

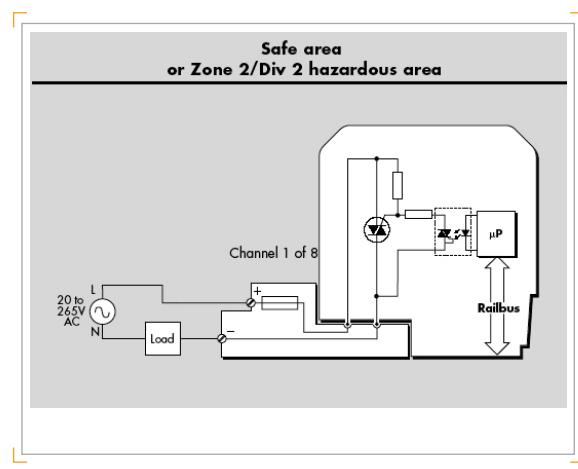
##### Field Terminals

| Field Wiring                                    | Recommended Field Terminal            | Compatible Field Terminal   |
|---|---------------------------------------|-----------------------------|
| General Purpose                                 | NT-8604-FT-FU<br>Fused                | NT-8602-FT-ST<br>Standard   |
| Class 1, Div 2<br>or Zone 2 hazard-<br>ous area | NT-8611-FT-FU<br>Non-arcing,<br>Fused | NT-8610-FT-NA<br>Non-arcing |

† Stated figures are for operation with unfused field terminal.  
When operating with 2 A fused field terminal part no. NT-8604-FT-FU, maximum switched current is 5 A inrush for <10 ms pulse width at 0.1% duty cycle and <10<sup>8</sup> operations.

\* Limited to 3 A per module.

‡Consult NovaTech for availability



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